

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 10757 (1983): Nickel silver rods and bars [MTD 8: Copper and Copper Alloys]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



IS : 10757 - 1983

Indian Standard
SPECIFICATION FOR
NICKEL SILVER RODS AND BARS

UDC 669.35.21.5-422



© Copyright 1984

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

AMENDMENT NO. 1 JUNE 2004
TO
IS 10757 : 1983 SPECIFICATION FOR NICKEL SILVER
RODS AND BARS

(*Page 4, clause 2.0, line 2*) — Substitute 'IS 3288 (Part 3) : 1986*' *for* 'IS : 3288 (Part 1) - 1981*'

(*Page 4, footnote marked '***) — Substitute the following for the existing footnote:

'*Glossary of terms relating to copper and copper alloys Part 3 Wrought forms '

(*Page 4, clause 3.1, line 2*) — Substitute 'IS 1387 : 1993†' *for* 'IS : 1387 - 1967†'.

(*Page 4, footnote marked '†'*) — Substitute the following for the existing:

'†General requirements for the supply of metallurgical materials (*second revision*).'

(*Page 5, clause 7.1, line 2*) — Substitute 'IS 1608 : 1995*' *for* 'IS : 2654 - 1977*'

(*Page 5, footnote marked '***) — Substitute the following for the existing footnote:

'*Mechanical testing of metals — Tensile testing (*second revision*).'

(*Page 6, clause 7.1.1, line 2*) — Substitute 'IS 1608 : 1995*' *for* 'IS : 2654 - 1977*'

(*Page 6, footnote marked '***) — Substitute the following for the existing footnote:

'*Mechanical testing of metals — Tensile testing (*second revision*).'

(*Page 6, clause 8.1, line 2*) — Substitute 'IS 2826 : 1986†' *for* 'IS : 2826 - 1980†'.

(*Page 6, footnote marked '†'*) — Substitute the following for the existing footnote:

'†Dimensions and tolerances for copper and copper alloys, rods and bars for general engineering purposes (*third revision*).'

(MTD 8)

Indian Standard

SPECIFICATION FOR NICKEL SILVER RODS AND BARS

Copper and Copper Alloys Sectional Committee, SMDC 11

Chairman

DR L. R. VAIDYANATH

Representing

Indian Copper Information Centre, Calcutta

Members

- SHRI D. DE SARKAR (*Alternate to*
Dr L. R. Vaidyanath)
- SHRI DEV KUMAR AGGARWAL Bralco Metal Industries Pvt Ltd, Bombay
- SHRI RAJ KUMAR AGGARWAL (*Alternate*)
- SHRI BAOHITAR SINGH Ministry of Defence [(DGI) / DPI(N)]
- SHRI M. R. ACHARYA (*Alternate*)
- SHRI K. L. BARUI National Test House, Calcutta
- SHRI H. P. DUBEY (*Alternate*)
- SHRI J. NAGESH BHATT Indian Telephone Industries Ltd, Bangalore
- SHRI A. R. SUKUMARAN (*Alternate*)
- SHRI BALEKHISHNA BINANI Rashtriya Metal Industries Ltd, Bombay
- DR V. S. PATKAR (*Alternate*)
- DR S. K. BISWAS Hindustan Copper Ltd, Calcutta
- PROF A. D. BOHRA Alcobex Metals (P) Ltd, Jodhpur
- SHRI S. D. NARKHADE (*Alternate*)
- SHRI L. N. CHAKRABORTY Bengal Ingot Co Ltd, Calcutta
- SHRI P. R. DHAR National Pipes and Tube Co Ltd, Calcutta
- SHRI A. K. MITRA (*Alternate*)
- SHRI P. GHOSH Indian Cable Co, Jamshedpur
- SHRI TRELOK SINGH (*Alternate*)
- SHRI H. N. GUPTA Ministry of Finance (India Government Mint).
Calcutta
- SHRI A. V. HARNE Bharat Heavy Electricals Ltd, Secunderabad
- DR M. N. CHANDRASEKHARIAH
(*Alternate I*)
- SHRI K. N. WADHWA (*Alternate II*)
- SHRI D. P. JAIN Saru Smelting Pvt Ltd, Meerut
- SHRI D. N. CHAKRABORTI (*Alternate*)
- SHRI R. P. KESAN KMA Ltd, Bombay
- SHRI A. H. SABHACHANDANI (*Alternate*)
- SHRI S. K. KHANDEKAR Vanaz Engineers (P) Ltd, Pune
- SHRI S. K. MOHANTY Directorate General of Ordnance Factories, Calcutta
- SHRI G. R. K. MURTHY Ministry of Defence (R & D)
- SHRI I. N. BHATIA (*Alternate*)

(Continued on page 2)

© Copyright 1984

INDIAN STANDARDS INSTITUTION

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

IS : 10757 - 1983

(Continued from page 1)

<i>Members</i>	<i>Representing</i>
SHRI T. RAMASUBRAMANIAN	Directorate General of Technical Development, New Delhi
SHRI T. R. MOHAN RAO (<i>Alternate</i>)	
SHRI P. S. RAMASWAMY	Bhandary Metallurgical Corporation Pvt Ltd, Bombay
SHRI M. K. RAO	Indian Non-ferrous Metals Manufacturers Associa- tion, Bombay
SHRI S. K. ROY	Ministry of Defence (DG1)
SHRI P. K. L. P. NIMANKAR (<i>Alternate</i>)	
SHRI R. N. SAHA	Directorate General of Supplies & Disposals, New Delhi
SHRI DIPANKAR KIRTI (<i>Alternate</i>)	
SHRI D. K. SEHGAL	Leader Engineering Works, Jalandhar
SHRI V. K. CHOUDHURY (<i>Alternate</i>)	
SENIOR CHEMIST & METALLUR- GIST, CENTRAL RAILWAY. BOMBAY	Ministry of Railways
DEPUTY DIRECTOR (MET)-II, RDSO, LUCKNOW (<i>Alternate</i>)	
SHRI A. SHANTHAKRAM	HMT Ltd, Bangalore
SHRI S. C. SIVARAMAKRISHNAN	National Metallurgical Laboratory (CSIR), Jamshedpur
SHRI A. R. C. SONDYS	The Institution of Engineers, Calcutta
SHRI J. SRIDHARAN	Ministry of Steel & Mines, New Delhi
SHRI P. SRIRAM	Rapsri Engineering Industries Pvt Ltd, Bangalore
SHRI N. S. SURANA	Multimetals Ltd, Kota
SHRI N. C. RAMAKRISHNANA (<i>Alternate</i>)	
SHRI SWAROOP KRISHNA	Indian Standard Metal Co Ltd, Bombay
SHRI S. S. VAIDYANATHAN	J. B. Metal Industries Pvt Ltd, Bombay
SHRI K. RAGHAVENDRAN, Director (Struc & Met)	Director General, ISI (<i>Ex-officio Member</i>)

Secretary

SHRI JAGMOHAN SINGH
Deputy Director (Met), ISI

Panel for Nickel Silver Rod and Bar, SMDC 11/P-35

<i>Members</i>	<i>Representing</i>
SHRI S. N. ARORA	Shalimar Wires & Industries Ltd, Calcutta
SHRI R. L. MAULIK (<i>Alternate</i>)	
SHRI J. NAGESH BHATT	Indian Telephone Industries Ltd, Bangalore
SHRI A. R. SUKUMARAN (<i>Alternate</i>)	
SHRI H. C. GOEL	Hindustan Aeronautics Ltd, Bangalore
SHRI R. N. BAJPAI (<i>Alternate</i>)	
SHRI S. L. JAIN	Alcobex Metals (P) Ltd, Jodhpur
SHRI S. D. NARKHADE (<i>Alternate</i>)	

Indian Standard

SPECIFICATION FOR NICKEL SILVER RODS AND BARS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 2 December 1983, after the draft finalized by the Copper and Copper Alloys Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 A major property of nickel-silver alloys is their colour which ranges from a soft ivory to silvery white, depending on the nickel content. These alloys have been used for centuries under a variety of names, the most common being German silver. However, they are known as nickel-silver in modern commercial practice. With the exception of cupro-nickel, these are the only alloys of copper that are white. Nickel silver are being used in the field of hardware for manufacture of rivets, nuts, bolts, small screws and also used in electrical machinery and apparatus, medical apparatus, camera parts, optical instruments, etc. Leaded nickel silver specified in this standard may be hot stamped and extruded into complex shapes. Specially the alloy CuNi18Zn27 is suitable as spring materials.

0.3 While preparing this standard, necessary assistance has been derived from 'ISO 430-1973 Wrought copper-nickel-zinc alloys - chemical composition and forms of wrought products' issued by the International Organization for Standardization.

0.4 In preparing this standard, the Sectional Committee kept in view the manufacturing and trade practices followed in the country in this field.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (revised).

IS : 10757 - 1983

1. SCOPE

1.1 This standard covers the requirements for four alloys of nickel silver and one alloy of leaded nickel silver rods and bars.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definition as given in IS : 3288 (Part 1)-1981* shall apply.

2.1 Bar/Rod — Any extruded, drawn, cold or hot rolled, forged cast or combination of any of these processes of solid section supplied in straight length, whose width or greatest distance between parallel faces is greater than 6 mm.

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of material shall conform to IS : 1387-1967†.

4. CONDITION

4.1 The material shall be supplied either in hard or in annealed condition except for leaded nickel silver (CuNi10Zn42Pb2) for which the material shall be supplied in as drawn (hard condition) unless otherwise specified by the purchaser.

5. FREEDOM FROM DEFECTS

5.1 The material shall be free from porosity and other defects of a nature that interfere with normal commercial operations. The material shall be suitably stress-relieved, if required.

6. CHEMICAL COMPOSITION

6.1 The material shall have the chemical composition given in Table 1.

6.2 The chemical composition shall be determined either by the method specified in IS : 4027-1967‡ or and other established instrumental/chemical method. In case of dispute the procedure specified in the latest edition of IS : 4027-1967‡ for chemical analysis shall be the referee method.

*Glossary of terms for copper and copper alloys: Part 1 Cast form and wrought form (main types) (*second revision*).

†General requirements for the supply of metallurgical materials (*first revision*).

‡Methods of chemical analysis of bronzes.

TABLE 1 CHEMICAL COMPOSITION

(Clause 6.1)

GRADE DESIGNATION	CONSTITUENT, PERCENT						
	Copper	Nickel	Manganese	Zinc	Iron Max	Lead	Total Other Impurities Max
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CuNi10Zn27	61.0-65.0	9.0-11.0	0.0-5	Remainder	0.3	0.05 Max	0.3
CuNi18Zn20	60.0-64.0	17.0-19.0	0.0-7	„	0.3	0.03 Max	0.3
CuNi12Zn24	62.0-66.0	11.0-13.0	0.0-5	„	0.3	0.05 Max	0.3
CuNi18Zn27	53.0-56.0	17.0-19.0	0.0-5	„	0.3	0.05 Max	0.3
CuNi10Zn42Pb2	44.0-48.0	9.0-11.0	0.0-5	„	0.5	1.0-2.5	0.5

7. MECHANICAL PROPERTIES

7.1 Tensile Test — The material when tested in accordance with IS : 2654-1977* shall have tensile properties as given in Table 2 and Table 3. The test piece shall be machined from samples selected in accordance with 9.3.

TABLE 2 MECHANICAL PROPERTIES OF AS-DRAWN (HARD)
NICKEL SILVER ROD/BAR

CROSS-SECTIONAL THICKNESS		GRADE DESIGNATION					
Over mm	Up to and Including mm	CuNi18Zn20 and CuNi10Zn42Pb2			CuNi10Zn27, CuNi12Zn24, and CuZn18Zn27		
		Tensile Strength		Elongation Percent on GL 5.65 \sqrt{A} Min	Tensile Strength		Elongation Percent on GL 5.65 \sqrt{A} Min
		Min MPa	Max MPa		Min MPa	Max MPa	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rannds, hexagon and octagon							
6	10	485	620	12	550	690	8
10	25	450	590	12	515	655	—
25	—	415	550	8	485	620	—
Square, rectangular							
All Sizes		470	605	8	515	650	5

*Method for tensile testing of copper and copper alloys (first revision).

**TABLE 3 MECHANICAL PROPERTIES OF ANNEALED NICKEL
SILVER ROD/BAR**

(Clause 7.1)

GRADE DESIGNATION	TENSILE STRENGTH	ELONGATION PERCENT	HARDNESS
	MPa <i>Min</i>	ON GL. $5.65\sqrt{A}$ <i>Min</i>	HV <i>Min</i>
CuNi10Zn27	360	50	80
CuNi18Zn20	400	43	90
CuNi12Zn24	370	50	90
CuNi18Zn27	400	45	95
CuNi18Zn42Pb2	540	22	150

7.1.1 The test pieces shall be machined to the shape specified in IS : 2654-1977* from samples selected in accordance with 9.3. In the case of rods and bars over 32 mm, the central longitudinal axis of test pieces shall be 16 mm away from the surface. For all other sizes, the central longitudinal axis of the test pieces shall be the same as that of rods or bars.

8. SIZE AND TOLERANCES

8.1 The material shall be supplied in any of the sizes and corresponding tolerances as specified in IS : 2826-1980†. By agreement between the purchaser and the manufacturer, the material may also be supplied to any other size and tolerances.

9. SAMPLING AND CRITERIA FOR CONFORMITY

9.0 Unless otherwise agreed between the purchaser and the supplier, the following sampling procedure and criteria for conformity shall hold good.

9.1 All the nickel silver rods/bars of the same grade (chemical composition), dimensions, temper and manufactured under similar condition of production, shall be grouped together to form lots of not more than 1 000 kg in mass. If the consignment exceeds 1 000 kg, two or more lots shall be formed and each lot shall be sampled separately for acceptance purposes.

9.2 From each bundle, 10 rods/bars shall be selected at random and be examined for visual and dimensional requirements. A rod or bar which fails in one or more of the requirements shall be termed as 'defective'. From the samples examined in each bundle not more than one defective shall be permitted. If this is exceeded, all the material in the bundle shall be subjected to visual and dimensional inspection.

*Method for tensile testing of copper and copper alloys (*first revision*).

†Dimensions for wrought copper and copper alloy rod and bar for general engineering purposes (*second revision*).

9.3 The scale of sampling for chemical analysis and mechanical tests shall be as follows:

<i>Specified Size (Diameter or Width Across Flats) of Material</i>		<i>Number of Tests for Chemical Analysis and Mechanical Properties</i>
Over mm	Up to and Including mm	
—	12	One test for every 250 kg or part thereof
12	40	One test for every 500 kg or part thereof
40	75	One test for every 1 000 kg or part thereof

9.3.1 For this purpose, the samples may be selected from the rods/bars which have been examined and found satisfactory for visual and dimensional requirements.

9.4 The lot shall be accepted if the samples tested meet all the chemical composition and mechanical properties requirements of the specification.

10. RETESTS

10.1 If a test result of chemical analysis fails to satisfy the requirements for any of the constituents, two more tests for that constituent shall be done on the same sample in order to confirm that the analysis has been done properly. If both the test results satisfy the relevant requirements the lot shall be considered as conforming to the specification, otherwise not.

10.2 Should any one of the samples first selected fail, two further samples from the same batch shall be taken, one of which shall be from the rod/bar from which the original sample was taken unless the same rod/bar has been withdrawn.

10.2.1 Should both these additional samples pass, the batch represented by the samples shall be deemed to comply with this standard. Should either of these additional samples fail, the batch represented by the samples shall be rejected.

11. PACKING

11.1 The material shall be supplied in bundles weighing about 50 kg and strapped with hoops or as required by the purchaser.

IS : 10757 - 1983

12. MARKING

12.1 Suitable tags with markings made on them to show the grade, and where applicable, temper of the material in addition to the name of the manufacturer, mass, size, lot number, date of manufacture and any such information required by the purchaser, shall be attached to each bundle of the material.

12.1.1 The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 01 31

Telegrams : Manaksanstha

Regional Offices:

		Telephone
Western : Novelty Chambers, Grant Road	BOMBAY 400007	89 65 28
Eastern : 5 Chowringhee Approach	CALCUTTA 700072	27 50 90
Southern : C. I. T. Campus, Adyar	MADRAS 600113	41 24 42
Northern : B69, Phase VII	S.A.S. NAGAR	8 78 26
	(MOHALI) 160051	

Branch Offices :

'Pushpak', Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	22 48 05
Gangotri Complex, Bhadbhada Road, T.T. Nagar	BHOPAL 462003	6 27 16
22E Kalpana Area	BHUBANESHWAR 751014	5 36 27
5-8-56C, L. N. Gupta Marg	HYDERABAD 500001	22 10 83
K 14 Yudhister Marg, C Scheme	JAIPUR 302005	6 98 32
117/418 B Sarvodaya Nagar	KANPUR 208005	4 72 92
Patliputra Industrial Estate	PATNA 800013	6 28 08
Master Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	32 27

Printed at Printograph, New Delhi, India